Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of:

Digital Audio Broadcasting Systems	)	
And Their Impact on the Terrestrial	)	**MB Docket No. 99-325**
Radio Broadcast System	)	

To the Commission:

Comments Concerning the Proposal to Increase the Power of IBOC DAB and Associated Studies

Introduction

In response to the Federal Communications Commissions, "COMMENT SOUGHT ON SPECIFIC ISSUES REGARDING JOINT PARTIES' EQUEST FOR FM DIGITAL POWER INCREASE AND SSOCIATED TECHNICAL STUDIES" along with "COMMENT SOUGHT ON JOINT PARTIES REQUEST FOR FM DIGITAL POWER INCREASE AND ASSOCIATED TECHNICAL STUDIES"; a group of 18 broadcasters

and the 4 largest manufacturers of broadcast transmission equipment along with iBiquity Digital Corporation ("iBiquity") (here after referred to as the "Joint Parties") are requesting that the Commission allow stations to increase the maximum permissible digital operating power from there current levels of 1 percent, -20 dBc, to 10 percent, -10 dBc without regard to potential interference.[1],[2].

Based on the foregoing inquiries in the Public Notice:

1. Whether the Bureau should defer consideration of the Joint Parties' requested power increase until the completion of and comment on the further NPR studies?

The Bureau should defer consideration of the Joint Parties' request for a power increase until at least a conclusion is reached with regards to the NPR studies.

The Commission has been lacks to encourage independent study of the whole IBOC issue. How should the Commission determine when interference is being caused by either the first adjacent station to an IBOC station, or the digital signals of the IBOC station to itself or to a first adjacent station or some other stations within the band? How much interference is acceptable? Should acceptability of interference be determined by subjective means?

IBOC mobile coverage is now listenable to approximately the 60 DBU contours of most stations that have installed IBOC except in cases of first adjacent interference. How much further should the IBOC signal extend beyond the 60 DBU contour? Should a power increase be approve to address the weaknesses of the IBOC signal within the interior spaces of a structure such as a building? So far, it has been shown by iBiquity and others that such a large power increase only yields a small improvement in the IBOC signal. Perhaps the power increase is not addressing the real issues at hand?

[1] Public Notice DA 09-1127 Released: May 22, 2009
[2] Public Notice DA 08-2340 Released: October 23, 2008

Further independent study is needed to determine answer to these and other questions. It is time for the Federal Communications Commission, Office of Engineering and Technology to conduct independent studies concerning the subject. As of this date many questions remain unanswered.

2. Whether the record in this proceeding, the real-world experience gained from over 1,400 FM stations operating for several years in the hybrid mode and the record of experimental authorizations at higher digital power levels warrant an increase in maximum digital operating power as proposed by the Joint Parties or support a provisional power increase of some lesser extent than that requested by the Joint Parties?

Complaints from the public have not accurately reflect the interference that the IBOC signal has caused to first adjacent, to the host companion analog signal, or other broadcast services that the public relies upon. Since the digital components of IBOC sound like noise to a conventional listener, the listener tends to have a problem distinguishing between IBOC interference and more conventional interference. IBiquity's own subjective studies have shown that the "noise like" interference can be difficult for a listener to discern as interference.

3. If the Commission does adopt a power increase, whether it should also establish standards to ensure the lack of interference to the analog signals of stations operating on first adjacent channels? Should such standards apply to, i.e., require the protection of, LPFM stations operating on first adjacent channels?

The Commission needs to address the issue of interference to first adjacent analog signals caused by an IBOC station. The Commission should establish minimal spacing requirements such that IBOC and first adjacent stations do not interfere with each other. The Commission should also keep in mind that most first adjacent stations should have priority over IBOC stations as far as interference is concerned, because IBOC is a new service to the community where as it is most likely that the first adjacent

station was serving the community before the IBOC signal and the IBOC signal is encroaching in to the first adjacent's licensed spectrum. The Commission needs to the establish procedures and policies in order to allow appropriate regulation of stations wishing to carry IBOC signals.

4. Finally, if the Commission does adopt a power increase, whether it should also establish more explicit procedures to resolve digital-into-analog interference complaints?

If the Commission does adopt a power increase, the Commission should also establish more explicit procedures to resolve digital to analog interference complaints.

Discussion

The Commission should realize that IBOC interference to analog stations is more prevalent than first assumed back in 2002. It would only follow to reason that extending a digital signal over an analog signal would cause problems.

IBiquity states that there have been no real world complaints. The American Public has had neither an established way of communicating such interference globally, to the Commission, nor any other independent agency, nor has been educated on the effects of such interference. Further, if there have been no complaints and there are no problems, why does NPR feel so lead to conduct further studies of the issues? After all, they are a significant investor in the technology.

IBiquity's own studies do not show significant improvement in the coverage area for the IBOC signal with a tenfold power increase. They also have not shown significant improvement in penetration of interior spaces with a tenfold power increase. There have been no independent studies to collaborate iBiquity's findings as of this date.

IBOC signal currently covers most of a station's 60 DBU contour as IBiquity's own studies demonstrate. IBiquity a number of maps in which they have plotted the performance of their signal at a number of seminars and more recently directly to members of the Federal Communications Commission in closed meetings.[3][4][5]

The figures below are one of IBiquity's cases for improvement to the IBOC signal at WJRZ, a class A station serving the New Jersey area.

[3] Notice of Ex Parte Presentation, March 06, 2009 – Present Rick C. Chessen of Acting Chairman Copp's office.
[4] Notice of Ex Parte Presentation, February 26, 2009 – Present Rudy Brioché of Commission Adelstein's office.
[5] Notice of Ex Parte Presentation, February 11, 2009 – Present James Bradshaw, Susan Crawford, Peter Doyle, Ann Gallagher, Tom Hutton, Charles Miller and Mary Beth Murphy of the Media Bureau..

The figure above shows IBiquity's test results for WJRZ with an IBOC signal level of -20 dBc.

The figure above shows IBiquity's test results for WJRZ with an IBOC signal level of -10 dBc.

The figure above shows IBiquity's test results for WJRZ with an IBOC signal level of -20 dBc with the predicted 60 dbu F(50:50) and the predict 54 dbu F(50:10) composited on top of IBiquity's test results. .

The figure above shows IBiquity's test results for WJRZ with an IBOC signal level of -10 dBc with the predicted 60 dbu F(50:50) and the predict 54 dbu F(50:10) composited on top of IBiquity's test results.

From IBiquity's own data, they have shown that there system performs has they had initially claimed. Should the signal be increased further? How far is to far? What are the justifications and the cost to the public, who have been slow to accept IBiquity's digital format? .

IBiquity has presented the data above with no detailed explanations of how the data was obtained. For example, there have been no studies showing the conditions of

neither the originating station, nor the surrounding stations during the test. There have been no statements on the receivers used, or the conditions that caused the IBOC signal to fail. What was the condition of the IBOC signal at the time? Can the signal be further modified to improve performance without the additional interference?

National Public Radio Labs -

Digital Radio Coverage & Interference Analysis (DRCIA) Research Project Final Report on CPB Contract No. 10446

"NPR, through the Corporation for Public Broadcasting (CPB) - funded Digital Radio Coverage and Interference Analysis (DRCIA) project, *which* examined the coverage capabilities and impact of in-band on channel digital audio broadcasting (IBOC DAB) in the United States.

The Corporation for Public Broadcasting created the DRCIA project with three primary goals in mind; to determine the coverage capabilities of (1) legacy analog FM service and (2) IBOC DAB service, and (3) evaluate the impact of the digital transmission system on reception of analog FM service, assuming all stations were operating in hybrid mode. While NPR's Executive Summary and the Full Report highlighted both positive and negative aspects to an increase in power to the IBOC signal, I have chosen to place an emphasis on the later.

NPR found:

1: "Unqualified 10% IBOC transmission power is predicted to cause substantial interference to analog reception of a significant number of first- and second-adjacent channel stations."[6]

[6] "NATIONAL PUBLIC RADIO, Final Report to the Corporation for Public Broadcasting, Digital Radio Coverage & Interference Analysis (DRCIA) Research Project, EXECUTIVE SUMMARY - July 09, 2008" pages 4 - 6.

2: From a theoretical model, at 1 percent IBOC transmission levels, "Mobile analog FM population would be reduced an average of 14% for the sample stations due to interference from IBOC DAB. This affects most stations in varying degrees in outlying portions of their mobile analog service area."[7]

3: At 10 percent IBOC transmission levels, "Analog FM indoor and portable covered population totals are reduced by 22% and 6%, respectively. Interference would affect some stations severely in portions of their analog indoor service area: 27% could lose one-third or more of their covered population and 16% could lose more than half of their population."[8]

4: “Station impacts from IBOC DAB to analog FM vary widely from station to station, primarily due to the fact that the IBOC DAB digital sidebands are actually co-channel to neighboring stations on first-adjacent channels; the FCC’s first-adjacent allocation rules for analog FM cannot adequately protect against some close-spaced conditions.”[9]

5: “Stations on “non-commercial” channels (88.1-91.9 MHz) and “commercial” FM channels (92.1-107.9 MHz) would receive similar amounts of interference to their analog operations from IBOC DAB at 10% power. This is notable since it was expected that commercial channels have more conservative protection standards.”[10]

6: “Initial projected system-wide estimates of the costs of deploying a combination of optimization strategies for indoor digital coverage parity could approach a doubling of transmission investments.”[11]

7: “Input interference to existing analog FM translators, should all stations convert to IBOC DAB, is expected to affect approximately 5% of all translators.”[12]

8: “Current field evidence, including listener reports, of interference to analog reception from IBOC DAB at 1% power is minimal. This may suggest that interference is less noticeable than predicted, however, due to the noise like nature of IBOC-to-analog interference, which lacks the audible clues of typical analog-to-analog interference, it may be difficult for

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[7] Id. 19
[8] Id. 19
[9] Id. 19
[10] Id. 19
[11] Id. 19
[12] Id. 19

> field listeners to identify an interfering IBOC signal and report their impaired reception."[13]

An uninformed listener will tend to accept and tolerate white or pink noise as normal, especially in these types of comparison test. However, the noise is a very undesirable artifact that degrades the listen-ability of the station especially when it is compared to another station without the artifact.

It has been long established by the Commission[14] and the industry that a standard minimum quality of signal should be maintained at broadcast sites. An overall 60 db signal to noise ratio should be obtainable for broadcast FM stations and has been a widely accepted defacto standard. Sometime in the past, the Commission required FM broadcast stations to meet this standard.

[13] Id 19
[14] 47 C.F.R. §§ 73.310, 47 C.F.R. §§ 73.319, 47 C.F.R. §§ 73.508

Band Expansion

In an earlier Public Notice[15], the Commission sought comments on the Expansion of the FM Band by reallocating the current television channels 5 and 6. Such a reallocation could solve a number of issues the Commission is faced with.

The figure below shows the area of the spectrum discussed for a proposed expansion of the FM broadcast band.

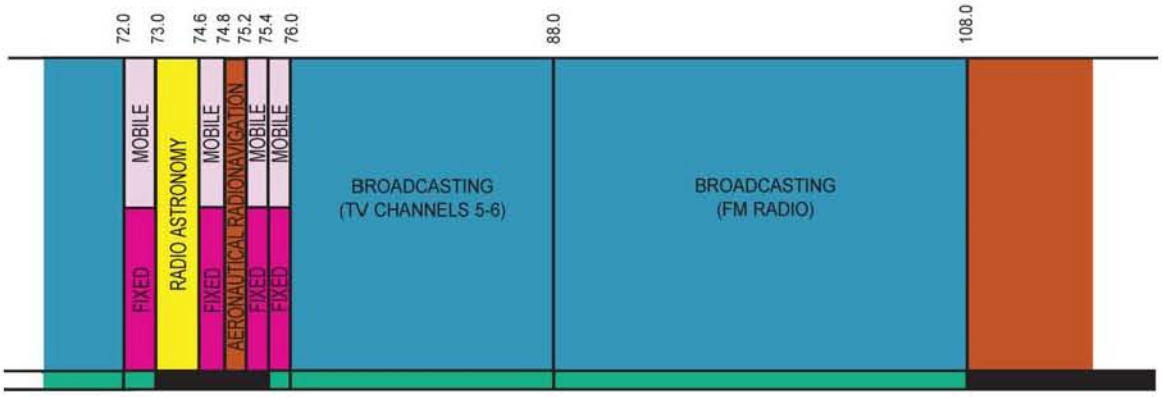

Figure 7[16]

Channels 5 and 6, from 76 to 88 MHz, are adjacent to each other and occupy 12 MHz. and reside jointly just below the current FM band. These channels would become a part of the new proposed expansion of the FM broadcasting band. In addition, the area below channel 5, 72 to 76 MHz, is allocated for fixed and mobile use. This area would provide a sufficient guard band to preclude the possibility of interference to DTV channel 4 in the proposed newly reallocated band. Due to the migration from analog television to digital television, the impact

[15] FCC – 07-217 Adopted: December 18, 2007 Released: March 05, 2008

[16] http://www.ntia.doc.gov/osmhome/allochrt.pdf

to the DTV broadcasters using channels 5 and 6 would be minimal at this time. The Commission should consider a shared use of these channels for an interim period of time with final use being devoted to new and existing radio services.

As far as receivers for reception of this new proposed band are concerned, many radios constructed for distribution in other markets outside the United States are already designed to operate from 76 MHz to 108 MHz. Unlike the familiar IBOC and DTV delays because of the lack of receivers and design modifications, radios would already be available upon approval of the band expansion.

The FM spectral crowding is almost unimaginably intense, and a real appetite exists for spectrum for FM broadcasting, as evidenced by the massive response to the recent FCC filing windows. The entire present Non-Commercial Educational or reserved band only occupies 4 MHz. On the other hand, a single DTV channel is 6 MHz wide. That is 1 and one half times the bandwidth of the entire non-commercial band. The commercial FM broadcasters have a total of 16 MHz or 2 2/3 DTV channels of spectrum. In contrast, there is a lot of spectrum allocated for DTV use, approximately 492 MHz; and every station has had two channels available during the DTV transition. Reallocation of DTV channels 5 and 6 would be a major improvement in the utilization of broadcast spectrum allowing better service to the overall public.

The creation of a new digital only band would allow interested digital only broadcasters to migrate to that spectrum. This band could be constructed such

that it would not have the noise and interference issues that currently exist in the current FM mix signal band with IBOC and other services.

The creation of a low power FM band would also give the low power FM people a place to reside with their unique programming. The remaining spectrum of the new band area could be used to allocate new noncommercial and commercial radio stations along with new FM translators.

Conclusion

The issue with the IBOC signal does not lie with power alone. The problem has more to do with the equalization and interference caused by the IBOC signal itself and interference from external sources such as first adjacent, the host companion signal and signal reflections. As of this date, there have been no independent quantitative studies of these sources of interference especially in real world environments.

In earlier documentation, iBiquity proposed a complete transition to iBiquity's IBOC system or a fully digital only band by the year 2020. IBiquity's IBOC system, in reality, requires 400 kilohertz of bandwidth to achieve a system of limited interference and proper operation. The current FM broadcasting model utilizes only 200 kHz bandwidth. No one has ever addressed where the extra bandwidth will come from or how it will affect the current radio broadcasting operators and services?

Further, if the FM broadcast band does become completely a digital only service, how will this affect ownership requirement? Current regulations allow

only limited ownership media outlets within a community. An IBOC signal has the potential to broadcast multiple streams of audio currently under one license. Is it fair that a large broadcaster who may own six stations within one market and be able to transmit at least 18 streams of audio within that same market? What happens to the small broadcaster who can not afford to acquire an IBOC system? It is important that the Commission preserve the small broadcaster. Larger broadcasters have taken away the localism of radio as they have seeked to maximize profits at the expense of the community and public service. The smaller broadcaster is a thread within the community. Their elimination would be the loss of the viewpoints of millions in this nation. Will the local community end up losing its local voice in the future?

When the Commission proposed a digital radio system, they had a number of goals that they wanted the industry to meet.

(1) enhanced audio fidelity;

(2) robustness to interference and other signal impairments;

(3) compatibility with existing analog service;

(4) spectrum efficiency;

(5) flexibility,

(6) auxiliary capacity;

(7) extensibility;

(8) accommodation for existing broadcasters;

(9) coverage; and

(10) implementation costs/affordability of equipment.[17]

Perhaps this is the moment to analyze how iBiquity's IBOC system has performed towards meeting these goals.

The Commission has been lacks in acknowledgement and encouraging independent studying of these issues. The Commission has not study how IBOC signals have interfered with FM services. It has been acknowledged by the industry that Low Power FM and Translators among other services have been interfered with by IBOC signals and if such a power increase were granted, many of these services would disappear from the band and public service. The Commission should encourage independent study of how such interference has and will affect these public services. Also, the Commission should encourage independent study on how the HD Radio and IBOC signals will Impact Diversity and Minorities with Respects to Radio Broadcasting[18].

I urge the Commission to move cautiously on iBiquity's request to increase HD IBOC power. Perhaps now is a good time to reflect on what the system was both deliver as stated back in 2001 and what the future may hold for the current digital audio broadcasting system.

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[17] Id. 9.
[18] FCC – 07-217 Adopted: December 18, 2007 Released: March 05, 2008
[19] Membership through Reach Communications, Inc.